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AND OF

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Announcements by the Council.

EXAMINATIONS, 1865.

The Programme of Examinations for 1865 is now ready, and may be had gratis on application to the Secretary.

Proceedings of the Society.

EXAMINATION PAPERS, 1864.

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in April last:—

(*Continued from page* 678.)

LOGIC AND MENTAL SCIENCE.

THREE HOURS ALLOWED.

All the candidates should attempt at least six questions in the first Section. In each of the other Sections they should attempt at least three questions.

LOGIC.

1. Illustrate the universal principle of reasoning as laid down by Aristotle.
2. Show that logic does not profess to furnish a peculiar method of reasoning.
3. What is the advantage of employing, in logic, unmeaning symbols instead of words which have a meaning?
4. Show how common terms are obtained, and how they are merely inadequate notions of individuals.
5. Explain Opposition and Conversion, according to Whateley, and offer any criticisms that occur to you.
6. Ordinate the following terms, first, in extension, and secondly, in comprehension:—

   Greek, European, Being, Animal, Man, Athenian, and explain the relation between Comprehension and Extension.

7. Give a table of judgments according to Thomson and Hamilton.
8. Give a table of the syllogistic figures, showing the places where the major premise, the minor premise, and the middle term stand in each figure.
9. Show why the middle term must be distributed in one of the terms of a syllogism.
10. Show the faults, if any, in the following syllogisms:—

    Some works of art are useful.
    All works of man are works of art.
    Some works of man are useful.

    All men are good.
    A murderer is a man.
    A murderer is good.

    All men are corporeal.
    No angels are men.
    No angels are corporeal.

11. Give some classification of Fallacies.

BISHOP BUTLER'S SERMONS.

1. How may the subject of morals be treated; and how does Butler treat the subject?
2. Give a scheme of the appetites and affections of human nature, and of their relations to each other.
3. Do you observe any inconsistency in the rank which Butler assigns to benevolence in different parts of his discourses?
4. If a man were to eat merely to support life, what would be his principle of action? If he were moved by hunger, what would be his principle of action?
5. Show how we could have no happiness if we had no affection but self-love.
6. Give a short abstract of Butler's eleventh sermon.
7. Give a short abstract of his system.

PALEY'S MORAL PHILOSOPHY.

1. What are the three rules of life according to Paley?
2. How do these rules often mislead us?
3. State one or two arguments for and against the system of moral instincts.
4. In what does an act of duty differ from an act of prudence? Criticise Paley's doctrine.
5. Illustrate the doctrine of general consequences, and show that whatever is expedient is right.
6. What two methods are there of coming at the will of God on any point?
7. How are rights divided?
8. State and refute the doctrine of the social compact.

STEWART'S PHILOSOPHY OF THE HUMAN MIND.

1. Show how the phenomena which the mind exhibits have no necessary connection with our opinions concerning its nature and essence.
2. Give some instances of our tendency to blend well-ascertained truths with principles which rest wholly on conjecture.
3. What natural prejudices seem to have given rise to the common theories of perception?
4. Distinguish between efficient causes and physical causes.

5. What is Stewart's opinion as to our power of attending to more than one thing at one and the same instant?
6. What is meant by the association of ideas? State some of the laws of association.
7. Illustrate the influence of association on our tastes.
8. What are meant by our secondary desires?
9. Explain Stewart's statement that the exercise both of conception and imagination is always accompanied with a belief that their objects exist.

MILLS' LOGIC.

1. Define Induction.
2. State and discuss the fundamental principle or general axiom of Induction.
3. Explain and criticise Mill's employment of the term *unconditionalness*.
4. Describe the kind of Induction which is natural to the mind when unaccustomed to scientific methods. How does Bacon characterise this kind of Induction?
5. Distinguish, after Mill, Proper Induction from Verbal Transformations.
6. State and briefly describe the principal operations which Mill regards as subsidiary to Induction.
7. What is meant by Anticipation, and what by Colligation in inductive inquiry?
8. Distinguish between Observation and Experiment?
9. Distinguish between Induction, Deduction, and Analogy.

LATIN AND ROMAN HISTORY.

THREE HOURS ALLOWED.

SECTION I.

Translate—

Illum ego per flammas et mille sequentia tela
Eripui his humeris, medioque ex hoste recepi;
Ille, meum comitatus iter, maria omnia mecum
Atque omnes pelagique minas coelique ferebat,
Invalidus, vires ultra sortemque senectae;
Quin, ut te supplex peterem et tua limina adirem,
Idem orans mandata dabat. Gnatique patrisque,
Alma, precor, miserere: potes namque omnia, nec te
Nequidquam lucis Hecate praefecit Avernis:
Si potuit Manes arcessere conjugis Orpheus,
Threïcia fretus cithara fidibusque canoris;
Si fratrem Pollux alterna morte redemit,
Itque reditque viam toties. Quid Thesea magnum,
Quid memorem Alciden? Et mî genus ab Jove summo.

1. Parse fully the words, *humeris, iter, pelagi, sortem, adirem, patris, omnia, lucis, citharâ, viam.*
2. Give the perfect tenses indicative and the active supines of the verbs *eripui, ferebat, peterem, potes, arcessere, redemit.*

Explain the allusions to *Orpheus, Pollux, Theseus, Alciden*

SECTION II.

Translate—

Quis procul ille autem ramis insignis olivae,
Sacra ferens? Nosco crines incanaque menta
Regis Romani, primus qui legibus urbem
Fundabit, Curibus parvis et paupere terra
Missus in imperium magnum. Cui deinde subibit,
Otia qui rumpet patriae, residesque movebit
Tullus in arma viros et jam desueta triumphis
Agmina. Quem juxta sequitur jactantior Ancus,
Nunc quoque iam nimium gaudens popularibus auris.
Vis et Tarquinios reges animamque superbam
Ultoris Bruti fascesque videre receptos?
Consulis imperium hic primus saevasque secures
Accipiet, natosque pater nova bella moventes
Ad poenam pulchra pro libertate vocabit.

1. Parse fully the words, *ramis, regis, terrâ, cui, triumphis, auris, natos, bella.*
2. Decline fully, *resides, fasces, secures, libertas.*
3. Give the perfect tenses, indicative, and the supines of the verbs, *nosco, missus, subibit, rumpet, sequitur, vis, videre, accipiet.*
4. Explain the allusions to *Numa, Ancus,* and *Brutus.*

SECTION III.

Translate—

Sed ubi ille adsedit, Catilina, ut erat paratus ad dissimulanda omnia, demisso voltu, voce supplici postulare, "Patres conscripti ne quid de se temere crederent; ea familia ortum, ita se ab adulescentia vitam instituisse, ut omnia bona in spe haberet; ne aestumarent, sibi, patricio homini, quoius ipsius atque majorum plurima beneficia in plebem Romanam essent, perdita re publica opus esse, quom eam servaret M. Tullius, inquilinus civis urbis Romae." ad hoc maledicta alia quom adderet, obstrepere omnes, hostem atque parricidem vocare. tum ille furibundus: "Quoniam quidem circumventus" inquit "ai inimicis praeceps agor, incendium meum ruina extinguam." —*Bell Cat.*, § xxxi.

1. Parse fully the words, *voltu, familiâ, sibi, perditâ, obstrepere, ruinâ.*
2. Give the perfect tenses, indicative, and the supines of the verbs, *crederent, haberet, perditâ, adderet, agor, extinguam.*
3. Turn Catilina's speech into *oratio recta.*

SECTION IV.

Translate—

Post eum diem quidam L. Tarquinius adductus ad senatum erat, quem ad Catilinam proficiscentem ex itinere retractum aiebant; is, quom se diceret indicaturum de conjuratione, si fides publica data esset, jussus a consule quae sciret edicere, eadem fere quae Volturcius, de paratis incendiis, de caede bonorum, de itinere hostium senatum docet; praeterea se missum a M. Crasso, qui Catilinae nuntiaret, ne eum Lentulus et Cethegus aliique ex conjuratione deprehensi terrerent, eoque magis properaret ad urbem accedere, quo et ceterorum animos reficeret et illi facilius e periculo eriperentur. sed ubi Tarquinius Crassum nominavit, hominem nobilem, maxumis divitiis, summa potentia, alii rem incredibilem rati, pars tametsi verum existumabant, tamen quia in tali tempore tanta vis hominis magis leniunda quam exagitanda videbatur, plerique Crasso ex negotiis privatis obnoxii conclamant indicem falsum esse, deque ea re postulant uti referatur. —*Bell Cat.*, § xlviii.

1. Parse fully *proficiscentem, ceterorum, eriperentur, divitiis, Crasso, indicem.*
2. Give the perfect tenses indicative and supines of the verbs *diceret, sciret, edocet, terrerent, rati, referatur.*
3. Decline fully *itinere, fides, rem, vis, hominis.*

SECTION V.

1. What were the powers of the Dictator? By whom was he appointed, and for what purpose? Mention instances.
2. Give an account of the seven consulships of the Fabii? What great men bore this name?
3. What was the purpose of the Terentilian Law? To what did it lead?
4. How did the first Decemvirate differ from the second?
5. What freed Rome from the Œqui and Volsci?
6. Give an account of the great Latin War, and the final settlement of Latium.

SECTION VI.

1. When was personal slavery for debt abolished and by whom?
2. Give an account of the war with Pyrrhus.
3. Write a life of Hannibal. What was the cause of his failure against Rome?
4. Narrate the successive steps by which Rome got complete possession of Greece.
5. What was the character of the Roman Government of the provinces?
6. Write a life of Cicero.

(To be continued.)

Proceedings of Institutions.

THE FAVERSHAM INSTITUTE.—ANNUAL MEETING.—On Wednesday, the 7th of August, the tenth annual meeting of the Faversham Institute was held in the Lecture Hall, Mr. James Higham in the chair. The Managing Director (the Mayor) then read the report, which stated that at the present time there are no less than 1,125 members, showing a net increase during the year of 120, and the Institution is now the largest of its kind in the county of Kent, and nearly the largest in the country. The finances are in a prosperous condition, the debt contracted last year to the treasurer is nearly liquidated. The library is well supported. The classes, with the exception of those for reading and writing, have not been so successful as could be wished. The committee report the success which attended the junior examinations in January, and the Society of Arts examinations in April. At the former twenty-one candidates presented themselves, and were examined in one or more of the following branches:—Arithmetic, English grammar, and composition, English history, reading, and writing. Nine of the candidates obtained prizes, which were publicly distributed in Faversham, by S. G. Johnson, Esq. At the Society of Arts examinations in April, eight candidates underwent the previous, and seven the final examinations. Of these, two obtained third-class, two second-class, and one a first-class certificate. Through the kindness of friends, the committee are in a position to give prizes to the successful candidates. These prizes, together with the certificates, will be publicly distributed on an early occasion. Prizes for answers to the questions in the *Monthly Journal* have been awarded to George Kay, Frederick Austin, T. C. Thornicraft, and to the representatives of the late Frederick Hills. The *Monthly Journal* has been published with considerable regularity during the year, and various other Institutes at Leeds, Newport, and other large towns have followed the example of the Faversham Institute, and are now publishing monthly records of their proceedings. A horticultural society, a musical society, a benefit society, and a cricket club have been established in connection with the Institute, and are successfully at work; and a working men's club has been affiliated to the Institute. The committee have sanctioned the formation of an economic museum, similar to that established at Twickenham, by Mr. Twining, one of the vice-presidents of the Society of Arts. The success of this project will entitle the Institute to a very liberal donation by Mr. Twining, in the shape of museum furniture, whilst it will tend very greatly to increase the usefulness of the Institute. The committee have offered the following prizes, to be competed for by members of the Institute: 1st, a book, the value of a guinea, for the best; 2nd, a book, the value of half a guinea, for the second best, essay on the "advantages to be derived from the study of history;" also a book, of the value of ten shillings, for the best, one of the value of seven shillings and sixpence for the second best, and one of the value of five shillings for the third best specimen of pencil drawing. The essays and drawings are to be forwarded to the Institute in November, and it is hoped that the competitors will be so numerous as to render a second offer of prizes desirable.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—BATH, 1864.

The thirty-fourth meeting of the Association commenced on Wednesday, the 14th instant, under the presidency of Sir Charles Lyell, Bart., LL.D., F.R.S. The General Committee held its first meeting at one o'clock, and the first general meeting of the Association was held in the Theatre, at eight o'clock, in the evening, when Sir W. G. Armstrong, the President for last year, resigned the chair to Sir Charles Lyell, who delivered an address, of which the following is an abstract:—

"The place where we have been invited this year to hold our thirty-fourth meeting is one of no ordinary interest to the cultivators of physical science. *What* renders Bath a peculiar point of attraction to the student of natural phenomena is its thermal and mineral waters, to the sanatory powers of which the city has owed its origin and celebrity. The great volume and high temperature of these waters render them not only unique in our island, but perhaps without a parallel in the rest of Europe, when we duly take into account their distance from the nearest region of violent earthquakes or of active or extinct volcanos.

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"One of our former Presidents, Dr. Daubeny, has remarked that nearly all the most celebrated hot springs of Europe, such as those of Aix-la-Chapelle, Baden-Baden, Naples, Auvergne, and the Pyrenees, have not declined in temperature since the days of the Romans, for many of them still retain as great a heat as is tolerable to the human body, and yet when employed by the ancients they do not seem to have required to be first cooled down by artificial means. This uniformity of temperature, maintained in some places for more than 2,000 years, together with the constancy in the volume of the water, which never varies with the seasons, as in ordinary springs, the identity also of the mineral ingredients which, century after century, are held by each spring in solution, are striking facts, and they tempt us irresistibly to speculate on the deep subterraneous sources both of the heat and mineral matter. How long has this uniformity prevailed? Are the springs really ancient in reference to the earth's history, or, like the course of the present rivers and the actual shape of our hills and valleys, are they only of high antiquity when contrasted with the brief space of human annals? May they not be like Vesuvius and Etna, which, although they have been adding to their flanks, in the course of the last 2,000 years many a stream of lava and shower of ashes, were still mountains very much the same as they now are in height and dimensions from the earliest times to which we can trace back their existence? Yet although their foundations are tens of thousands of years old, they were laid at an era when the Mediterranean was already inhabited by the same species of marine shells as those with which it is now peopled; so that these volcanos must be regarded as things of yesterday in the geological calendar.

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"The hot springs of the Pyrenees, the Alps, and many other regions are situated in lines along which the rocks have been rent, and usually where they have been displaced or "faulted." Similar dislocations in the solid crust of the earth are generally supposed to have determined the spots where active and extinct volcanos have burst forth; for several of these often affect a linear arrangement, their position seeming to have been determined by great lines of fissure. Another connecting link between the volcano and the hot spring is recognizable in the great abundance of hot springs in regions where volcanic eruptions still occur from time to time. It is also in the same districts that the waters occasionally attain the boiling temperature, while some of the associated stufas emit steam considerably above the boiling point. But in proportion as we recede from the great centres of igneous activity, we find the thermal waters decreasing in frequency and in their average heat, while at the same time they are most conspicuous in those territories where, as in Central France or the Eifel in Germany, there are cones and craters still so perfect in their form, and streams of lava bearing such a relation to the depth and shape of the existing valleys, as to indicate that the internal fires have become dormant in comparatively recent times. If there be exceptions to this rule, it is where hot springs are met with in parts of the Alps and

Pyrenees which have been violently convulsed by modern earthquakes.

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"Dr. Daubeny, after devoting a month to the analysis of the Bath waters in 1833, ascertained that the daily evolution of nitrogen gas amounted to no less than 250 cubic feet in volume. This gas, he remarks, is not only characteristic of hot springs, but is largely disengaged from volcanic craters during eruptions.

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"Carbonic acid is another of the volatilised substances discharged by the Bath waters. Dr. Gustav Bischoff, in the new edition of his valuable work on chemical and physical geology, when speaking of the exhalations of this gas, remarks that they are of universal occurrence, and that they originate at great depths, becoming more abundant the deeper we penetrate. He also observes that when the silicates, which enter so largely into the composition of the oldest rocks, are percolated by this gas, they must be continually decomposed, and the carbonates formed by the new combinations thence arising must often augment the volume of the altered rocks. This increase of bulk, he says, must sometimes give rise to a mechanical force of expansion capable of uplifting the incumbent crust of the earth, and may also act laterally so as to compress, dislocate, and tilt the strata. There are probably many distinct causes of such upward, downward, and lateral movements, and any new suggestion on this head is most welcome; but I believe the expansion and contraction of solid rocks, when they are alternately heated and cooled, and the fusion and subsequent consolidation of mineral masses, will continue to rank, as heretofore, as the most influential causes of such movements.

"The temperature of the Bath waters varies in the different springs from 117° to 120° Fahr. This, as before stated, is exceptionally high, when we duly allow for the great distance of Bath from the nearest region of active or recently extinct volcanos and of violent earthquakes. The hot springs of Aix-la-Chapelle have a much higher temperature, viz., 135° Fahr., but they are situated within forty miles of those cones and lava streams of the Eifel, which, though they may have spent their force ages before the earliest records of history, belong, nevertheless, to the most modern geological period. Bath is about 400 miles distant from the same part of Germany, and 440 from Auvergne—another volcanic region, the latest eruptions of which were geologically coëval with those of the Eifel. When these two regions in France and Germany were the theatres of frequent convulsions, we may well suppose that England was often more rudely shaken than now; and such shocks as that of October last, the sound and rocking motion of which caused so great a sensation as it traversed the southern part of the island, and which seems to have been particularly violent in Herefordshire, may be only a languid reminder to us of a force of which the energy has been gradually dying out. The geological map of the environs of Bath shows numerous lines of fault or displacement of the rocks, and one of these has shifted the strata vertically as much as 200 feet. There are other lines of displacement not yet laid down on the map the existence of which must be inferred from the different levels at which the same formations crop out on the flanks of the hills to the north and south of the city. I have therefore little doubt that the Bath springs, like most other thermal waters, mark the site of some great convulsion and fracture which took place in the crust of the earth at some former period—perhaps not a very remote one, geologically speaking.

"If we adopt the theory that the nitrogen is derived from the deoxidation of atmospheric air carried down by rain-water, we may imagine the supply of this water to be furnished by some mountainous region, perhaps a distant one, and that it descends through rents or porous rocks till it encounters some mass of heated matter by which it is converted into steam, and then driven upwards through a fissure. In its downward passage the water may derive its sulphate of lime, chloride of calcium, and other substances from the decomposition of the gypseous, saline, calcareous, and other constituents of the rocks which it permeates.

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"Professor Roscoe, of Manchester, has been lately engaged in making a careful analysis of the Bath waters, and has discovered in them three metals which they were not previously known to contain—namely copper, strontium, and lithium; but he has searched in vain for cæsium and rubidium, those new metals, the existence of which has been revealed to us in the course of the last few years by spectrum analysis.

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"It is impossible not to suspect that the wonderful efficacy of some mineral springs, both cold and thermal, in curing diseases, which no artificially prepared waters have as yet been able to rival, may be connected with the presence of one or more of these elementary bodies previously unknown; and some of the newly found ingredients, when procured in larger quantities, may furnish medical science with means of combating diseases which have hitherto baffled all human skill.

"While I was pursuing my inquiries respecting the Bath waters, I learned casually that a hot spring had been discovered at a great depth in a copper mine near Redruth in Cornwall, having about as high a temperature as that of the Bath waters, and of which, strange to say, no account has yet been published. It seems that, in the year 1839, a level was driven from an old shaft so as to intersect a rich copper-mine at the depth of 1,350 feet from the surface. Through the contents of this lode (known as the Wheal Clifford lode) a powerful spring of hot water was observed to rise, which has continued to flow with undiminished strength ever since. The water has been analyzed by Professor William Allen Miller, F.R.S., who finds that the quantity of solid matter is so great as to exceed by more than four times the proportion of that yielded by the Bath waters. Its composition is also in many respects very different, for it contains but little sulphate of lime, and is almost free from the salts of magnesium. It is rich in the chlorides of calcium and sodium, and it contains one of the new metals—cæsium, never before detected in any mineral spring in England, but its peculiar characteristic is the extraordinary abundance of lithium, of which a mere trace had been found by Professor Roscoe in the Bath waters, whereas in this Cornish hot spring this metal constitutes no less than a twenty-sixth part of the whole of the solid contents.

"Hot springs are, for the most part, charged with alkaline and other highly soluble substances, and, as a rule, are barren of the precious metals, gold, silver, and copper, as well as of tin, platinum, lead, and many others, a slight trace of copper in the Bath waters being exceptional. Nevertheless there is a strong presumption that there exists some relationship between the action of thermal waters and the filling of rents with metallic ores. The component elements of these ores may, in the first instance, rise from great depths in a state of sublimation or of solution in intensely heated water, and may then be precipitated on the walls of a fissure as soon as the ascending vapours or fluids begin to part with some of their heat. Almost everything, save the alkaline metals, silica, and certain gases, may thus be left behind long before the spring reaches the earth's surface. If this theory be adopted, it will follow that the metalliferous portion of a fissure, originally thousands of feet or fathoms deep, will never be exposed in regions accessible to the miner until it has been upheaved by a long series of convulsions, and until the higher parts of the same rent, together with its contents and the rocks which it had traversed, have been removed by aqueous denudation. Ages before such changes are accomplished thermal and mineral springs will have ceased to act; so that the want of identity between the mineral ingredients of hot springs and the contents of metalliferous veins, instead of mili-

tating against their intimate relationship, is in favour of both being the complementary results of one and the same natural operation.

"But there are other characters in the structure of the earth's crust more mysterious in their nature than the phenomena of metalliferous veins, on which the study of hot springs has thrown light—I allude to the metamorphism of sedimentary rocks. Strata of various ages, many of them once full of organic remains, have been rendered partially or wholly crystalline. It is admitted on all hands that heat has been instrumental in bringing about this re-arrangement of particles, which, when the metamorphism has been carried out to its fullest extent, obliterates all trace of the imbedded fossils. But as mountain-masses many miles in length and several thousands of feet in height, have undergone such alteration, it has always been difficult to explain in what matter an amount of heat capable of so entirely changing the molecular condition of sedimentary masses could have come into play without utterly annihilating every sign of stratification, as well as of organic structure.

"Various experiments have led to the conclusion that the minerals which enter most largely into the composition of the metamorphic rocks have not been formed by crystallizing from a state of fusion, but that they have been derived from liquid solutions—a process requiring a far less intense degree of heat. Thermal springs, charged with carbonic acid and with hydro-fluoric acid (which last is often present in small quantities), are powerful causes of decomposition and chemical reaction in rocks through which they percolate. If, therefore, large bodies of hot water permeate mountain-masses at great depths, they may in the course of ages superinduce in them a crystalline structure; and in some cases strata in a lower position and of older date may be comparatively unaltered, retaining their fossil remains undefaced. while newer rocks are rendered metamorphic. This may happen where the waters, after passing upwards for thousands of feet, meet with some obstruction, as in the case of the Wheal-Clifford spring, causing the same to be laterally diverted so as to percolate the surrounding rocks. The efficacy of such hydro-thermal action has been admirably illustrated of late years by the experiments and observations of Sénarmont, Daubrée, Delesse, Scheerer, Sorby, Sterry Hunt, and others."

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"The study, of late years, of the constituent parts of granite has led to the conclusion that their consolidation has taken place at temperatures far below those formerly supposed to be indispensable. Gustav Rose has pointed out that the quartz of granite has the specific gravity of 2·6, which characterizes silica when it is precipitated from a liquid solvent, and not that inferior density, namely 2·3, which belongs to it when it cools and solidifies in the dry way from a state of fusion. But some geologists, when made aware of the intervention, on a large scale, of water, in the formation of the component minerals of the granitic and volcanic rocks, appear of late years to have been too much disposed to dispense with intense heat when accounting for the formation of the crystalline and unstratified rocks. As water in a state of solid combination enters largely into the aluminous and some other minerals, and therefore plays no small part in the composition of the earth's crust, it follows that, when rocks are melted, water must be present, independently of the supplies of rain-water and sea-water which find their way into the regions of subterranean heat. But the existence of water under great pressure affords no argument against our attributing an excessively high temperature to the mass with which it is mixed up. Still less does the point to which the melted matter must be cooled down before it consolidates or crystallizes into lava or granite afford any test of the degree of heat which the same matter must have acquired when it was melted and made to form lakes and seas in the interior of the earth's crust.

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"The exact nature of the chemical changes which hydrothermal action may effect in the earth's interior will long remain obscure to us, because the regions where they take place are inaccessible to man; but the manner in which volcanos have shifted their position throughout a vast series of geological epochs—becoming extinct in one region and breaking out in another—may, perhaps, explain the increase of heat as we descend towards the interior, without the necessity of our appealing to an original central heat or the igneous fluidity of the earth's nucleus.

"I hinted, at the beginning of this address, that the hot springs of Bath may be of no high antiquity, geologically speaking,—not that I can establish this opinion by any positive proofs, but I infer it from the mighty changes which this region has undergone since the time when the British seas, rivers, and lakes were inhabited by the existing species of Testacea. Marine straits extended, at a modern period, between what are now the estuaries of the Severn and the Dee, as shown by the discovery of marine shells of recent species in drift covering the water-shed which divided those estuaries. At the time when these shells were living, the Cotswold Hills formed one of the numerous islands of an archipelago into which England, Ireland, and Scotland were then divided. The amount of vertical movement which would be necessary to restore such a state of the surface as prevailed when the position of land and sea were so different would be very great.

"Nowhere in the world, according to our present information, is the evidence of upheaval, as manifested by upraised marine shells, so striking as in Wales. Fossil shells in stratified drift have been found at the top of a hill called Moel Tryfaen, near the Menai Straits, and not far from the base of Snowdon. The whole fauna bears testimony to a climate colder than that now experienced in these latitudes. A considerable part of what is called the glacial epoch had already elapsed before the shelly strata in question were deposited on Moel Tryfaen, as we may infer from the polished and striated surfaces of rocks on which the drift rests, and the occurrence of erratic blocks smoothed and scratched, at the bottom of the same drift."

The President then discussed the supposed causes of the glacial period, and specially mentioned one suggested by a celebrated Swiss geologist, M. Escher von der Linth, who "gave it as his opinion in 1852, that if it were true, as Ritter had suggested, that the great African desert, or Sahara, was submerged within the modern or post-tertiary period, that same submergence might explain why the Alpine glaciers had attained so recently those colossal dimensions which, reasoning on geological data, Venetz and Charpentier had assigned to them. Since Escher first threw out this hint, the fact that the Sahara was really covered by the sea at no distant period has been confirmed by many new proofs. The distinguished Swiss geologist himself has just returned from an exploring expedition through the eastern part of the Algerian desert, in which he was accompanied by M. Desor, of Neuchatel, and Professor Martins, of Montpellier. These three experienced observers satisfied themselves, during the last winter, that the Sahara was under water during the period of the living species of Testacea. Other important changes in these regions had evidently taken place, so great indeed that a map of Africa in the glacial period would no more resemble our present maps of that continent than Europe now resembles North America. If, then, argues Escher, the Sahara was a sea in post-tertiary times, we may understand why the Alpine glaciers formerly attained such gigantic dimensions, and why they have left moraines of such magnitude on the plains of northern Italy and the lower country of Switzerland. The Swiss peasants have a saying, when they talk of the melting of the snow, that the sun could do nothing without the Föhn, a name which they give to the well-known sirocco. This wind, after sweeping over a wide expanse of parched and

burning sand in Africa, blows occasionally for days in succession across the Mediterranean, carrying with it the scorching heat of the Sahara to melt the snows of the Apennines and Alps. . . . . MM. Escher and Denzler have both of them observed, on different occasions, that the thickness of one foot of snow has disappeared in four hours during the prevalence of this wind."

After mentioning other instances showing the great power of this wind, and the important influence of its intermittent action, the President went on to urge that much greater changes would result from its total cessation. But this would give "no idea of what must have happened in the glacial period; for we cannot suppose the action of the south wind to have been suspended; it was not in abeyance, but its character was entirely different, and of an opposite nature, under the altered geographical conditions above contemplated. First, instead after passing over a parched and scorching desert, between the twentieth and thirty-fifth parallels of latitude, it would plentifully absorb moisture from a sea many hundreds of miles wide. Next, in its course over the Mediterranean, it would take up still more aqueous vapour; and when, after complete saturation, it struck the Alps, it would be driven up into the higher and more rarified regions of the atmosphere. There the aerial current, as fast as it was cooled, would discharge its aqueous burden in the form of snow, so that the same wind which is now called 'the devourer of ice' would become its principal feeder.

"If we thus embrace Escher's theory, as accounting in no small degree for the vast size of the extinct glaciers of Switzerland and northern Italy, we are by no means debarred from accepting at the same time Charpentier's suggestion, that the Alps in the glacial period were 2,000 or 3,000 feet higher than they are now. Such a difference in altitude may have been an auxiliary cause of the extreme cold, and seems the more probable now that we have obtained unequivocal proofs of such great oscillations of level in Wales within the period under consideration. We may also avail ourselves of another source of refrigeration which may have coincided in time with the submergence of the Sahara, namely, the diversion of the Gulf-stream from its present source. The shape of Europe and North America, or the boundaries of sea and land, departed so widely in the glacial period from those now established, that we cannot suppose the Gulf-stream to have taken at that period its present north-western course across the Atlantic. If it took some other direction, the climate of the north of Scotland would, according to the calculations of Mr. Hopkins, suffer a diminution in its average annual temperature of 12° Fahr., while that of the Alps would lose 2° Fahr." A combination of these and other conditions, which might be enumerated, would certainly be attended with so great a revolution in climate as might go far to account for the excessive cold which was developed at so modern a period in the earth's history.

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"The more we study and comprehend the geographical changes of the glacial period, and the migrations of animals and plants to which it gave rise, the higher our conceptions are raised of the duration of that subdivision of time, which, though vast when measured by the succession of events comprised in it, was brief if estimated by the ordinary rules of geological classification. The glacial period was, in fact, a mere episode in one of the great epochs of the earth's history; for the inhabitants of the lands and seas, before and after the grand development of snow and ice, were nearly the same. As yet we have no satisfactory proof that man existed in Europe or elsewhere during the period of extreme cold; but our investigations on this head are still in their infancy. In an early portion of the post-glacial period it has been ascertained that man flourished in Europe; and in tracing the signs of his existence, from the historical ages to those immediately antecedent, and so backward into more ancient times, we gradually approach a dissimilar geographical state of things, when the climate was colder, and when the configuration of the surface departed considerably from that which now prevails.

"Archæologists are satisfied that in central Europe the age of bronze weapons preceded the Roman invasion of Switzerland: and prior to the Swiss-lake dwellings of the bronze age were those in which stone weapons alone were used. The Danish kitchen-middens seem to have been of about the same date; but what M. Lartet has called the reindeer period of the South of France was probably anterior, connected with a somewhat colder climate. Of still higher antiquity was that age of ruder implements of stone such as were buried in the fluviatile drift of Amiens and Abbeville, and which were mingled in the same gravel with the bones of extinct quadrupeds, such as the elephant, rhinoceros, bear, tiger, and hyena. Between the present era and that of those earliest vestiges yet discovered of our race, valleys have been deepened and widened, the course of subterranean rivers which once flowed through caverns has been changed, and many species of wild quadrupeds have disappeared. The bed of the sea, moreover, has in the same ages been lifted up, in many places hundreds of feet, above its former level, and the outlines of many a coast entirely altered.

"MM. de Verneuil and Louis Lartet have recently found, near Madrid, fossil teeth of the African elephant, in old valley-drift, containing flint implements of the same antique type as those of Amiens and Abbeville. Proof of the same elephant having inhabited Sicily in the Postpliocene and probably within the Human period had previously been brought to light by Baron Anca, during his exploration of the bone-caves of Palermo. We have now, therefore, evidence of man having coexisted in Europe with three species of elephant, two of them extinct (namely, the mammoth and the *Elephas antiquus*), and a third the same as that which still survives in Africa. As to the first of these—the Mammoth—I am aware that some writers contend that it could not have died out many tens of thousands of years before our time, because its flesh has been found preserved in ice, in Siberia, in so fresh a state as to serve as food for dogs, bears, and wolves; but this argument seems to me fallacious. Middendorf, in 1843, after digging through some thickness of frozen soil in Siberia, came down upon an icy mass, in which the carcase of a mammoth was imbedded, so perfect that, among other parts, the pupil of its eye was taken out, and is now preserved in the Museum of Moscow. No one will deny that this elephant had lain for several thousand years in its icy envelope; and if it had been left undisturbed, and the cold had gone on increasing, for myriads of centuries, we might reasonably expect that the frozen flesh might continue undecayed until a second glacial period had passed away.

"When speculations on the long series of events which occurred in the glacial and postglacial periods are indulged in, the imagination is apt to take alarm at the immensity of the time required to interpret the monuments of these ages, all referable to the era of existing species. In order to abridge the number of centuries which would otherwise be indispensable, a disposition is shown by many to magnify the rate of change in prehistoric times, by inventing the causes which have modified the animate and inanimate world with extraordinary and excessive energy.

"I will now briefly allude, in conclusion, to two points on which a gradual change of opinion has been taking place among geologists of late years. First, as to whether there has been a continuous succession of events in the organic and inorganic worlds, uninterrupted by violent and general catastrophes; and secondly, whether clear evidence can be obtained of a period antecedent to the creation of organic beings on the earth. I am old enough to remember when geologists dogmatised on both these questions in a manner very different from that in which they would now venture to indulge. I believe that by far

the greater number now incline to opposite views from those which were once most commonly entertained. On the first point it is worthy of remark that although a belief in sudden and general convulsions has been losing ground, as also the doctrine of abrupt transitions from one set of species of animals and plants to another of a very different type, yet the whole series of the records which have been handed down to us are now more than ever regarded as fragmentary. They ought to be looked upon as more perfect, because numerous gaps have been filled up, and in the formations newly intercalated in the series we have found many missing links and various intermediate gradations between the nearest allied forms previously known in the animal and vegetable worlds. Yet the whole body of monuments which we are endeavouring to decipher appears more defective than before. For my own part, I agree with Mr. Darwin in considering them as a mere fraction of those which have once existed, while no approach to a perfect series was ever formed originally, it having never been part of the plan of Nature to leave a complete record of all her works and operations for the enlightenment of rational beings who might study them in after-ages.

"In reference to the other great question, or the earliest date of vital phenomena on this planet, the late discoveries in Canada have at least demonstrated that certain theories founded in Europe on mere negative evidence were altogether delusive. In the course of a geological survey, carried on under the able direction of Sir William E. Logan, it has been shown that northward of the river St. Lawrence there is a vast series of stratified and crystalline rocks of gneiss, mica-schist, quartzite, and limestone, about 40,000 feet in thickness, which have been called Laurentian. They are more ancient than the oldest fossiliferous strata of Europe, or those to which the term primordial had been rashly assigned. In the first place, the newest part of this great crystalline series is unconformable to the ancient fossiliferous or so-called primordial rocks which overlie it, so that it must have undergone disturbing movements before the latter or primordial set were formed. Then again the older half of the Laurentian series is unconformable to the newer portion of the same. It is in this lowest and most ancient system of crystalline strata that a limestone, about a thousand feet thick, has been observed, containing organic remains. These fossils have been examined by Dr. Dawson, of Montreal, and he has detected in them, by aid of the microscope, the distinct structure of a large species of Rhizopod. Fine specimens of this fossil, called *Eozoon Canadense*, have been brought to Bath by Sir William Logan, to be exhibited to the members of the Association. We have every reason to suppose that the rocks in which these animal remains are included are of as old a date as any of the formations named azoic in Europe, if not older, so that they preceded in date rocks once supposed to have been formed before any organic beings had been created.

"But I will not venture on speculations respecting 'the signs of a beginning,' or 'the prospects of an end,' of our terrestrial system—that wide ocean of scientific conjecture on which so many theorists before my time have suffered shipwreck. Without trespassing longer on your time, I will conclude by expressing to you my thanks for the honour you have done me in asking me to preside over this meeting. I have every reason to hope, from the many members and distinguished strangers whom I already see assembled here, that it will not be inferior in interest to any of the gatherings which have preceded it."

A vote of thanks to Sir Charles Lyell was proposed by the Mayor of Bath, seconded by Sir Roderick Murchison, and carried by acclamation.

THE DUBLIN INTERNATIONAL EXHIBITION IN 1865.

In order to secure an adequate representation of the Manufactures and Industries of the United Kingdom, the executive have applied to the Society of Arts for their assistance; and, with the sanction of the Council, a committee of advice has been formed in London to promote, as far as possible, the success of the Exhibition. The following gentlemen have kindly consented to act on this committee:—Messrs. J. Anderson; R. K. Bowley; E. A. Bowring, C.B.; Antonio Brady; Sir David Brewster, F.R.S.; Henry Cole, C.B.; Sir C. Wentworth Dilke, Bart.; Messrs. Thos. Fairbairn; J. H. Foley, R.A.; Geo. Godwin, F.R.S.; George Grove; William Hawes, Chairman of the Council of the Society of Arts; R. Hudson, F.R.S.; Owen Jones; Charles Manby, F.R.S.; P. C. Owen; Hon. B. F. Primrose; S. Redgrave; Sir Cusack P. Roney; Sir F. R. Sandford; Messrs. R. A. Thompson; E. Waterton; J. Way; G. F. Wilson, F.R.S.; Thos. Winkworth; M. Digby Wyatt; P. Le Neve Foster, M.A., Hon. Sec. The Council, desiring to render such support as may be in their power, have acceded to the request of the committee to be permitted the use of the Society's house for the transaction of business.

The building in which the Exhibition will be held is fast approaching completion. Designed to give to the inhabitants of Dublin similar facilities for recreation and instruction to those which the Crystal Palace offers to Londoners, the Exhibition Palace and Winter Garden will be found well adapted for an effective display both of Art and Industry. A number of Irish noblemen and gentlemen, anxious to take advantage of the opportunity presented to them by the erection of this building, have patriotically come forward to give their support and countenance to an undertaking which promises to be so beneficial to Arts and Manufactures in their own country. The General Committee under whose auspices the Exhibition will be inaugurated includes some of the most influential and distinguished public men in Ireland, and a thoroughly national character is thus guaranteed to the undertaking. On this Exhibition Committee are found, among others, the names of the Lord Chancellor of Ireland, Duke of Leinster, Earl of Rosse, Earl of Charlemont, Earl of Clancarty, Viscount Gough, Viscount Powerscourt, Lord Talbot de Malahide, Sir George Hodson, Sir R. Griffith, Sir Robert Kane, the Lord Mayor of Dublin, Hon. St. John Butler, Hon. J. P. Vereker, Messrs. B. L. Guinness, W. Dargan, Gilbert Sanders, F. W. Brady, J. Lentaigne, W. Le Fanu, &c., some of whom are already favourably known by their co-operation in the Dublin Exhibition of 1853.

The executive have entered into an arrangement with the company who have erected the building, under the terms of which the Exhibition Palace and Winter Garden will be placed at their disposal for the period of the exhibition. Out of the receipts the company will be repaid any cost they have been put to for additional buildings erected for the purposes of the Exhibition, and will also receive a certain fixed sum for the use and wear and tear of their premises. Any surplus remaining after these charges have been defrayed will be applied to the purposes of National Industry and Art, according to the direction of the Exhibition Committee.

Offers and assurances of support have been received from many of the large towns and manufacturing districts on the Continent, and applications for space have been made by several of the principal manufacturers in England.

Although not on so large a scale as the Great Exhibitions of 1851 and 1862, the Dublin International Exhibition of 1865 may be easily made both attractive and successful. Every attempt which is made to turn the attention of the Irish people to Arts and Manufactures is deserving of sympathy and support, and it is to be hoped that the artists and manufacturers of the United Kingdom will on this occasion give their best co-operation.

UTILISATION OF SEWAGE OF TOWNS.

A select committee of the House of Commons sat in May, June, and July of the present year to inquire into plans for dealing with the sewage of the metropolis and other large towns, with a view to its utilisation for agricultural purposes. The committee examined a great number of witnesses, and the report agreed to, and just published, is as follows:—

"The committee commenced their inquiry by examining into all those plans for utilising, in a liquid state, the sewage of the metropolis, which had been laid before the Metropolitan Board of Works, and were referred to the committee by an order of the House. The committee have ascertained, from Cornish engineers of the greatest reputation, the prices of the steam-engines and pumps which would be required to raise various quantities of sewage to stated heights. Mr. Bateman, the well-known water engineer, was examined as to the prices of the mains and pipes which would be necessary for the conveyance and distribution of sewage over land, and the estimated cost of laying them down and jointing them. The committee has come to the conclusion that it is not only possible to utilise the sewage of towns, by conveying it in a liquid state through mains and pipes to the country, but that such an undertaking may be made to result in pecuniary benefit to the ratepayers of the towns whose sewage is thus utilised. That benefit may, in a few years, be greatly increased, for the amount of artificial manures is even at present insufficient, and the sources whence some of the most important are obtained will in a few years be exhausted. Other means of fertilising land must, therefore, be resorted to.

"The committee, having examined the chairman and engineer of the Metropolitan Board of Works, are of opinion that more might have been done by that Board towards the profitable use of the sewage of London; and that the completion of the outfall sewerage of the metropolis ought, at the earliest possible moment, to be followed by the adoption of a system which may convert that sewage from a nuisance into a permanent and increasing source of agricultural fertility.

"Even if a pecuniary benefit were not to be secured, yet such a consideration should not deter local authorities from taking such steps as are possible to free rivers from pollution.

"The committee examined several witnesses regarding the pollution of the rivers and streams of the country. There can be no doubt as to the injury which results from the practice of conducting sewage and other refuse matters into the rivers, whence numerous towns, villages, and country populations derive their water supply. It is imperatively necessary that such a practice should be discontinued. No efficient artificial method has been discovered to purify, for drinking and culinary purposes, water which has been once infected by town sewage. By no known mechanical or chemical means can such water be more than partially cleansed; it is always liable to putrefy again. Processes of filtering and deodorisation cannot, therefore, be relied upon to do more than mitigate the evil. Water which appears perfectly pure to the eye is sufficient, under certain conditions, to breed serious epidemics in the population which drinks it. Soils, however, and the roots of growing plants, have a great and rapid power of abstracting impurities from sewage water, and rendering it again innocuous and free from contamination. Mr. Ffennell, the chief inspector of fisheries, stated in his evidence that sewage water in a putrefying state is destructive to fish. A considerable increase in the amount of food for the people, and of revenue to the owners of rivers would, therefore, result from purifying the rivers of the United Kingdom, which are now contaminated by sewage and other matters.

"If the sewage of towns is no longer to flow into rivers, the only alternative which remains is to dispose of it on the land.

"It has been decided that it is a nuisance at common law to discharge any sewage into a river. Yet the law is, nevertheless, inoperative, for want of powers to remove the nuisance.

"Until within the last thirty years it has been the custom to utilise all the nightsoil and other refuse on the land. Great obstructions used to be thrown in the way of making house drains which should empty themselves into the street sewer. The use of the latter was confined to the conveyance of the surface waters of the towns. There was a service of scavengers, whose duty it was to remove excrementitious matters in their carts; and it was the office of the mayors of towns to take care that rivers, streams, and ponds were kept free from all noxious or filthy substances. But when the modern water-closets came into vogue, and the practice was introduced of flushing house drains into the sewers, then the diluted nightsoil first began to find its way into rivers. Yet the removal of house refuse to the land would now be much easier and cheaper than it was formerly, because carriage by suspension in a liquid is the cheapest mode of transport.

"In many towns of Lancashire there are to this day numerous cess-pits. This is the case with Manchester, where the local authorities expend about £20,000 a year for emptying them, and then removing the contents to the land, and receive back 50 per cent. by the sale of the material. A system of sewerage, and the necessary works to remove all the refuse in a liquid state to the adjacent fields, would, in Mr. Rawlinson's opinion, cause a saving to the town.

"The Commissioners of Sewers and the Board of Health took no steps to prevent the introduction of the practice of flushing the refuse of houses into the street sewers, and thence into the rivers. For they were of opinion that no time should be lost in freeing habitations from the dangerous infection of putrefying substances; and assumed that when this more pressing object had been accomplished the law would be again respected, and measures would be taken to free the rivers and restore the refuse once more to the land.

"Dwelling-houses in the metropolis and many parts of England have already been freed, which has caused the increased pollution of rivers. This latter evil is becoming worse every year in proportion to the adoption of a better water supply, of a more perfect system of house drainage, and the increase of the population.

"Dr. Acland and other witnesses believe that rivers can be effectually freed from pollution only by extending the Local Government Act to entire watersheds; or, rather, by establishing boards somewhat similar to the present local boards of towns, which should extend over the whole area of each catchment basin, instead of being restricted to the precincts of each town. These watershed or catchment boards should, in the opinion of those witnesses, have all the powers for this purpose which are now enjoyed by the local boards of towns: and they should be placed under the direct authority and supervision of the Home Office. They, furthermore, hold that it should be the duty of the Home Secretary to see that the law as to the pollution of streams is strictly enforced by these watershed boards.

"The secretary of the local government office, as well as Mr. Rawlinson, the inspecting engineer, while concurring in the necessity of appointing a board for each catchment basin, gave a decided opinion that the duty of the watershed board should be merely to supervise the action of the local boards within their district, and enforce an obedience to the law in causing them to desist from polluting the streams, but that the necessary works should be carried out by the local boards alone.

"The committee recommend that the important object of completely freeing the entire basins of rivers from pollution should be rendered possible by general legislative enactment, enabling the inhabitants of such entire districts to adopt some controlling power for that purpose; but it should include a provision for compelling

local boards to render the sewage of their districts innocuous by application to the land for agricultural purposes. The case of the valley of the Thames (where the purification of the river, which has been sought by the expenditure of enormous sums, is to a considerable extent counteracted by the increased discharge of sewage from the towns higher up the streams) requires special and immediate attention.

"Before concluding the inquiry the committee received some evidence with regard to the measures now being carried out by the Metropolitan Board of Works for diverting the sewage of the metropolis. This inquiry the committee have been unable to complete."

THE PATENT-OFFICE.

The report of the Commons' Select Committee appointed to inquire as to the most suitable arrangements to be made respecting the Patent-office, library, and museum has been printed. The committee, in the first place, report that the present office is totally wanting in the accommodation requisite for giving full effect to the Patent Law Amendment Act, 1852, and the patent system generally. For this purpose suitable apartments for the Commissioners, law officers, and clerks, with a record-office and rooms for inspecting provisional specifications, drawings, and scientific publications, should at once be provided; the place now used for the inspection of classifications and drawings is little better than a dark passage, in which there is barely standing room. With regard to the library, the committee have found that it is one of great value and utility, but that its utility is seriously impaired by its crowded state and the want of sufficient attendants. The inconvenience to those who frequent the office and library arising from this state of things is such as to render some remedy imperatively necessary. The committee consider that the want of increased accommodation in respect of the Patent-office and library is so much felt as to prejudice the due administration of the patent law, and they therefore recommend that sufficient office-room, with an additional reading-room and an extension of the library, should be provided with the least possible delay. The committee further recommend that the library should on no account be separated from the office. All witnesses concur in this opinion.

The second point to which the Committee directed their attention was that of the Patent Museum. The Committee found that the Patent Museum was formed by Mr. Woodcroft, the Superintendent of Specifications, by the request of the Commissioners of Patents, and that it consists of models and machines, belonging partly to the Commissioners of Patents, partly to the Commissioners of the Exhibition of 1851, and partly to Mr. Woodcroft himself and various private persons. This collection has been exhibited since 1857 in the iron building at South Kensington. It occupies a floor space of only 6,700 feet, and is too much overcrowded for classification or for due inspection by visitors. The Committee are of opinion that the term "Patent Museum" tends to give an erroneous opinion as to its character and object. The Committee are of opinion that any special collection of patented inventions made for the purpose of evidence, illustration, or record of patent rights is not so connected with a general museum of mechanical inventions as to render the neighbourhood of such a museum to a patent office and library or law courts necessary. It appears to the committee that the chief purposes of a general museum is to illustrate and explain the commencement, progress, and present positions of the most important branches of mechanical invention; to show the chief steps by which the most remarkable machines have reached their present degree of excellence; to convey interesting and useful information, and to stimulate invention.

The Committee proceed to say that, in forming an illustrative collection of inventions, it would be necessary to adopt the principle of selection. This, however, does not appear to the Committee to be an insuperable objection, especially as no one proposes to substitute models for specifications, which, for all the purposes of administering the patent law, would still have to be consulted, and bear the stamp of authority. Such a collection should contain a selection of models of moderate size which should illustrate different departments of inventions, and also a selection of models of current patented inventions. This collection should be exhibited in connection with the Patent-office.

As regards the Patent-office—that is to say, the office, library, and last-mentioned collection, the following are the sites respecting which their inquiries have been chiefly directed.—1. Chancery-lane.—This is a block of land, occupied principally by old and dilapidated houses, and surrounded by Southampton-buildings, Chancery-lane, Cursitor-street, and Took's-court. It is most conveniently placed, being in close proximity to the law-courts at Lincoln's-inn, the Inns of Court, and the New Record-office. Another site, immediately adjoining that last named was suggested; it extends to the north side of the Record-office. Should the plan for concentrating all the law courts in the neighbourhood of Chancery-lane, which has been recently under the consideration of Government, be carried into effect, it will afford an additional argument in favour of either site. The cost of the first-named site, amounting to 5,878 yards, was estimated at £205,000. 2. Fife-house.—This block consists of Fife-house (in which the East India Museum is now placed), an adjoining garden, and some small houses. It contains in all about two acres, and appears to the committee to be well situated for the buildings in question. The committee, however, do not consider that it offers as many advantages as the Chancery-lane site would afford, being more distant from the law courts and offices. This has been estimated at the price of £52,800 per acre. 3. Victoria-street.—This consists of a block of land in Victoria-street, which would afford sufficient space for the proposed buildings, but the committee do not consider that the situation would be as convenient as either of the two last-named sites for inventors, professional men, and others who would principally resort to it. This site is estimated at £66,000. It contains an area of nearly an acre and a quarter. 4. Trafalgar-square.—This has been recommended by some witnesses; but, having regard to the recent decision of the House upon the subject of the National Gallery, the committee did not feel justified in entertaining the proposition. 5. South Kensington.—Ample space may be afforded in the vicinity of the present museum for a general museum of mechanical inventions. The land of this site is vested in Government for purposes connected with science and art, but the committee have ascertained that the land in this neighbourhood is of a high value.

The report proceeds to state that on a full consideration of the advantages and disadvantages of these sites the committee have arrived at the conclusion that the balance of advantages in favour of the neighbourhood of Chancery-lane outweighs that of the others, and they therefore recommend it for adoption. The committee find that the surplus of revenue beyond expenditure on the balance of accounts of the fees payable by stamps under the provisions of the Patent Law Amendment Act, 1852, has amounted to £173,044 up to the end of 1862, and that the surplus for the year 1863, of which the accounts have not yet been published, is estimated to amount to £37,000, making, up to the end of last year, a total surplus revenue of £210,044 [the Patent-office report just issued states last year's surplus to be £43,968.] The committee consider that the principal object of the fees payable under the provisions of the Patent Law Amendment Act was to provide for the proper working of that measure, *and not for* the purpose of increasing the general revenue of the

country. Without entering upon the question whether or not a claim exists to have the surplus exclusively devoted to the purposes of the Act of 1852, the committee are of opinion that for the future the annual surplus revenue accruing from the operation of that Act should be so supplied to the extent which may be necessary.

Fine Arts.

ART EXHIBITION AT MALINES.—An exhibition (referred to in a former number) of works of Christian art of the mediæval and renaissance periods, on loan from churches, corporations, and private collections, is now being held at Malines, under Government patronage, and will remain open until September 25. It includes ivory carvings, enamels of the 12th century, gold and silver work, niello-work, Mosaics, tapestry, &c. The price of admission is one franc.

SCHOOL OF FINE ARTS, PARIS.—The annual exhibition of the works of the pupils in painting, sculpture, architecture, and line engraving, is announced to take place on the 21st of the present month of September; this exhibition only remains open for five days.

ARCHITECTURAL PRIZE.—The Duc de Valmy has placed at the disposal of the Academy of Fine Arts the sum of 1,500 francs, to be given to the author of the best essay on a general question of architecture; the academy has in consequence published the following theme:—"To explain principles and rules of architecture; to develop the theory of the art as applicable to our epoch." The essays are to be sent in on or before the 15th July, 1865.

Manufactures.

FLAX IN IRELAND.—Lord Lismore, in a speech made on the occasion of the Clogheen Union Farming Society's Show, recently held at Cahir, in the county of Tipperary, dwelt particularly upon the cultivation of flax, about which there is much difference of opinion among the landlords. Some consider the interest felt about it to be a mania, which will soon pass away; and they ask, if the Irish small farmers have never been able to treat their land properly for ordinary crops, how could they be expected to do so for a crop which requires so much care as flax? Lord Lismore first combated the idea that the demand for flax depended mainly on the cotton famine, and would cease on the restoration of peace in America. Quoting the Board of Trade returns, he showed that in 1853 the importation of flax from Russia and Belgium was £3,300,000. Since that time it had increased to £6,000,000, and he asked was it not reasonable that the Irish farmers should try to get some portion of that sum which was paid for the raw material of our linen manufacture, and at the same time vastly extend employment to those who were leaving the country in thousands for the want of it. They had got in that Union this year 350 acres of flax, which was reported to be an excellent crop, both in quantity and quality. They had started a new scutch-mill, and since they began to scutch they had four different offers to buy all the flax grown in the union—two from Belfast, one from Limerick, and one from Dundalk. They had an offer from a Dublin merchant to buy up the whole of their seed, and an offer from a Belfast merchant to buy up the whole of their refuse tow. There would, therefore, be no want of a market and good prices. A tenant of his had grown an acre of flax, on which he had saved twenty-eight bushels of prime seed, for which he would get 5s. a bushel, which would be £7 an acre, more than the value of a crop of oats, leaving the flax itself a clear gain. Another tenant fed his calves with his seed, and never had such calves in his life. Beginning in a small way, they would go on until he had no doubt they would make a great revolution in the industrial resources of the country.

ATMOSPHERIC STEAM HAMMER.—An atmospheric hammer and stamp is now being shown in operation in Birmingham, under the supervision of the patentee, Mr. Grimshaw. Its mode of working is as follows:—An air-pump is worked by a band from a shaft, and forces air into a reservoir, which is so constructed as to form the framework of the machine. The reservoir, in its turn, communicates with a cylinder, in which a piston works with so little friction that it can be moved up and down by hand. This piston is, in fact, the hammer, inasmuch as at the end of it is fitted a head, which may be varied in form to suit any kind of work. The shaft, on which is fixed the pulley-wheel to which the pump crank is geared, has another wheel fitted upon it, which performs a very important operation. By means of a screw or lever (either will do), the last-named wheel can be so moved to or from the the centre of the revolving plate, which is attached to the "cut off" valve, that the speed of the hammer can be varied entirely at the discretion of the operator. This wheel and plate work at right angles to one another, and when not in contact the hammer does not work. The reservoir is capable of bearing great pressure, and will store up, so to speak, a large amount of power, until it is wanted for a series of smashing blows. A valve attached to this reservoir prevents it bursting, and appears to be a valuable assistant means of regulating and varying the action of the hammer; and if it is true that these atmospheric hammers and stamps can be worked with much less power than steam stamps, costing less in the first instance, they cannot, from the simplicity of their construction, cost nearly so much to keep in repair.

Commerce.

FRENCH AND BELGIAN TARIFFS.—REDUCTION OF IMPORT DUTIES ON BRITISH PRODUCE AND MANUFACTURES.—By virtue of the provisions in the commercial treaties between this country and France and Belgium, for the reduction of certain import duties in the tariffs of those countries on the 1st October, 1864, the rates of duty levied on the under-mentioned articles will experience a considerable diminution from the 1st October next:—In France—On jute yarns, jute tissues, woollen tissues, iron and steel and wares thereof, brass and copper and wares thereof, lead and wares thereof, zinc and wares thereof, earthen and stonewares, chemicals, perfumery, paper, and ships and boats. In Belgium—On cotton yarns, linen yarns, jute yarns, woollen yarns, cotton prints, woollen tissues, iron and steel and wares thereof, brass and copper wares, and chemicals. The actual amounts of the duties in force from the above-mentioned date will be found in parliamentary paper, No. 493, of session 1863, parts 1 to 10, which may be purchased for a few pence at the office for the sale of parliamentary papers.

VINTAGE IN FRANCE.—A letter from Montpellier, of the 4th instant, states that the long drought promises, according to the vinegrowers, a vintage of excellent quality but deficient in quantity. There has at last been a fall of rain of short duration, but it has not been injurious to the gathering of the grapes, which has commenced in several of the vineyards in the neighbourhood of the town. The vintage has commenced in the greater part of the department of the Gard, and it is expected that the produce will be equal in quantity to that of the best years, and that the quality will be excellent. The proprietors of vineyards were apprehensive that the crop would be deficient in consequence of the very dry summer, but the rain which fell last month swelled the grapes and repaired the injury they had previously sustained.

SUPPLY OF RAW SILK.—The silk trade in France seems to be in almost as much difficulty with respect to raw material as its sister cotton manufacture. The culture of silk in France has long been in an unsatisfactory condition, the supply falling short of the demand or the

price rising from time to time to a ruinous pitch. Great efforts have been made in various directions to increase the produce; silkworm eggs have been fetched from China and other places, with great care and cost, and many new kinds of eggs have been introduced from abroad with the hope of obtaining more hardy and more productive worms. The *Magnanerie*, as a silkworm nursery is called, in the *Jardin d'Acclimatation* in the Bois de Boulogne of Paris, is just now an object of considerable attraction, and contains many thousand worms of various kinds, and amongst others the *Bombyx mori* of China, and the *B. blanche* of Japan, which feed on the leaves of the mulberry; the *Bombyx cynthia vera* and the *B. Arrindia*, which live on the castor-oil plant and the leaves of the *Ailanthus*, or Japan varnish tree; and the *Bombyx Yamamai* and *B. Permyi* of China and Japan, which devour oak leaves. These two latter are in the open air, and hopes are entertained that they may acclimatise in Western Europe. There is also another establishment adjoining the Imperial model farm of Vincennes, where M. Guérin-Méneville—whose exhibition of some of these worms and their produce in the French department of the London Exhibition of 1862 excited considerable attention—is pursuing their cultivation with a view to practical results. In the meantime, the want of the eggs, or seed as it is called, of the silkworms already cultivated in France, is great, and apparently very difficult to supply. Not long since some adventurous persons announced their intention of seeking a supply of eggs in Independent Tartary, but they were warned by the Ministry of Commerce that it would expose themselves to great danger in that country, and therefore renounced their project. News has since been received from Teheran, by the Minister of Commerce, that there would be a better chance of success in Persia, and the attention of cultivators is now directed to that country. It appears, however, that several parties have set out on this errand from Constantinople, but have been deterred from proceeding by information which they obtained at Tiflis. The opinion seems to be that interested speculators in silk have managed, for their own interest, to prevent the French agents from obtaining a supply of the eggs. Be that as it may, it is certain that the trade in silkworm eggs is but little developed, although the demand is very great in Europe, and in spite of the success which has attended the importations which have been made from China. The cultivation of silk is carried on in five provinces of Persia, Meshed, Yezd, Cachan, Mazenderan, and Ghilan, but the quantity and quality differ greatly. The worms obtain little of the care which is bestowed upon them in France, where the duties of the sericulteur are constant and most troublesome. In Persia the worms are placed on rough wooden stages, and, being supplied with plenty of food, are left almost to themselves till the spinning time arrives; yet is is said that the disease which has attacked the worms so seriously in France is not known in Persia. The inference drawn is that the Persian silk worm is more hardy than those reared in France. The statistics of the culture in the former country are not very complete, for the French authorities have been unable to procure even an approximate estimate of the amount of silk produced in more than three of the above-named provinces. Cachan is said to yield only 750 kilogrammes—an insignificant quantity—Yezd, 21,000 kilos.; and Ghilah, 206,000 kilos.; in all about 478,000 lbs. English.

Colonies.

MORTALITY IN THE SYDNEY SUBURBS.—The *Sydney Morning Herald*, June 18, says:—"Before we can compute the proportion which the number of registered deaths bears to the number of persons living, we must, of course, carefully estimate the numbers of the population from the best data within our reach. As regards the city and suburbs of Sydney, the population in each of the years between the censuses of 1856 and 1861 cannot be more fairly estimated than by assuming that the annual rate of the ascertained increase had been uniform throughout the interval. The first of the annexed tables shows the population in the middle of the year, estimated on the principle above explained, and the number of deaths registered; the second gives the rate of mortality in each of the years, with the mean of the three; and the third the rate in each of the four seasons.

TABLE I.

ESTIMATED POPULATION IN THE MIDDLE OF EACH YEAR, AND NUMBER OF DEATHS REGISTERED IN EACH YEAR.

Suburbs.		1861.	1862.	1863.
Whole suburbs,	Population	37,301	39,300	41,406
,,	Deaths ...	596	789	846
Balmain	Population	3,991	4,205	4,432
,,	Deaths ...	63	81	84
Glebe	Population	3,768	3,969	4,182
,,	Deaths ...	66	105	87
Newtown	Population	4,290	4,520	4,761
,,	Deaths ...	68	98	87
Redfern	Population	6,789	7,153	7,636
,,	Deaths ...	136	209	241
Paddington	Population	6,863	7,231	7,618
,,	Deaths ...	98	125	160
Concord	Population	9,387	2,515	2,650
,,	Deaths ...	41	50	53
St. George	Population	5,707	6,013	6,335
,,	Deaths ...	74	78	94
St. Leonards ...	Population	3,506	3,694	3,892
,,	Deaths ...	50	43	40

TABLE II.

ANNUAL RATES OF MORTALITY TO 1,000 PERSONS LIVING.

Suburbs.	1861.	1862.	1863.	Mean.
Whole suburbs	16·0	20·1	20·4	18·8
Balmain	15·8	19·3	19·0	18·0
Glebe	17·5	26·4	20·8	21·6
Newtown	15·9	21·7	18·3	18·6
Redfern	20·0	29·2	32 0	27·1
Paddington	14·3	17·5	21·0	17·6
Concord	17·2	19·9	20·0	19·0
St. George	13·0	13·0	14·8	13·6
St. Leonards	14·3	11·7	10·3	12·1

Of the nine suburbs of London, the most favoured is Hampstead, whose death-rate is 17·6 per thousand; the least favoured Chelsea, 26·6 per thousand. The most healthy of the suburbs of London is thus less healthy than the healthiest of ours by 8·1 per thousand; and the least healthy of the London suburbs more healthy than the least healthy of ours by 0·9."

REVENUE OF NEW SOUTH WALES.—From a comparative statement of the Consolidated Revenue of this colony, and of the special funds paid into the Treasury at Sydney during the quarters ended 31st March, 1863 and 1864 respectively, it appears that the total revenue proper for the first quarter of the year 1864 amounts to £290,305 6s. 5d., against £337,038 14s. for the corresponding quarter of the year 1863. The decrease on the quarter is, therefore, £46,733 7s. 7d., or nearly 14 per cent. The principal heads of revenue which show a decrease are the customs, £24,274; duty on spirits distilled in the colony, £7,246; gold, £5,664; land, £27,302; electric telegraph receipts, £1,552. There is also a small decrease in the revenue derived from the mint

receipts of £83; licenses, £276; fines and forfeitures, £151; and rates under Chinese Act, £40. The heads of revenue which show an increase are—duty on refined sugar and molasses, £7,333; postage, £951; commission on money orders, £237; fees of office, £30; rents, exclusive of land, £1,090; railways, £3,852; pilotage rates, harbour dues, and fees, £209; tonnage dues, Newcastle, £12; interest on city debentures, £5,000; and miscellaneous receipts, £1,068. In the Customs' revenue the falling off is in the receipts from spirits, wine, tobacco, tea, sugar and molasses, and coffee and chicory; but from ale and beer, opium, and other articles there is an increase. For duty on spirits distilled in the colony there have been no receipts this quarter, and this accounts for the large decrease; but on the other hand there is almost a similar amount collected for duty on refined sugars and molasses, against nil for the first quarter of 1863. Under the head of gold, the decrease is in the duty on gold, leases of auriferous lands, miners' rights and business licenses; but for fees for escort and conveyance of gold there is a small increase of £94. With regard to the land revenue, the principal decrease is in the amount derived from the land sales. For the first quarter of 1864 the receipts amounted to only £24,775 against £52,135 in 1863, the decrease being £27,360. The rents of land for pastoral purposes and assessment on runs show an increase, but from quit rents, licenses to cut timber, &c., on crown lands and mineral leases there is a decrease. There is a steady increase of about eight per cent. on the postage receipts, but the commission on money-orders has reached £255 during the past quarter, against £18 for the corresponding quarter of 1863. Under the head of rents, exclusive of land, which includes tolls and ferries, wharfs, military canteen, Government buildings, and Glebe Island Abattoir, the receipts amount to £6,232 against £5,143 in 1863. It is satisfactory to find that the railway tolls show an increase of £3,852, or 13 per cent., the receipts being £32,587 against £28,735; but from the electric telegraph receipts there is a decrease for the first time of £1,552 or 17 per cent. Under the head of Interest on City Debentures there is a sum of £5,000 for the first quarter of 1864 against nil in 1863. Special receipts in the present statement published by the Government include immigration remittances, which formerly appeared under the head of revenue proper, but the difference in the past quarter and that of 1863 is only £496. There is a new item—Imperial postage, £4,955 against nil in 1863. The total amount received under the head of special receipts for the first quarter of 1864 is £15,511 against £9,585 in 1863, which is an increase of £5,925 on the quarter.

NEW ZEALAND INDUSTRIAL EXHIBITION.—The Local Committee of the New Zealand Industrial Exhibition meet weekly, and have done good service in waiting upon the classes likely to send articles for exhibition. There is every reason to suppose that the industry and talent of Otago will be well represented. At the meeting of the Committee, on Wednesday, 11th May, it was stated that 139 applications for space had been made, requiring an area of 7,000 square feet, and wall space equal to 3,761 square feet. Several tradesmen are preparing articles expressly for the Exhibition, of a most elaborate kind, tending not only to evince their own artistic skill but the capabilities of many native products to usefulness and ornamentation. The building for their reception is rapidly progressing, and the interest in the province appears to be on the increase.

NEW ZEALAND GOLD FIELDS.—Accounts from gold fields, received since the publication of the last summary, are encouraging. The escort returns show that the increased yield of gold mentioned at that time has been maintained, and, although there has been some excitement among the miners in consequence of the glowing accounts of discoveries of gold in the province of Marlborough, and several have left to try their fortunes there, the inducements scarcely appear sufficient to warrant the idea that they will be recompensed for their change of place, as the gold fields of Otago, when skilfully and persistently worked, afford ample return for labour. The various circumstances under which gold is found in the province of necessity render slight fluctuations in the year inevitable. The rocks in which it is embedded yield to atmospheric and thermatic atmospheric influences, and, crumbling under the combined action of frost, air, and water, are washed down by the mountain torrents into the river beds. When, therefore, the river workings are practicable, they give in return for efforts an almost incredible quantity of gold; but, from their very nature, they are uncertain and fitful. The quantity of gold exported from the province of Otago during the current year to this date is 217,511 ozs. 8 dwts. The quantity exported previously is as follows:—

	ozs.
1861	187,695
1862	397,602
1863	580,233
	1,165,530

Making a grand total of 1,388,041 ozs. 8 dwts. The escorts have brought down 191,379 ozs. 16 dwts. It is the general conviction of those qualified, from local knowledge and previous occupation, to form an opinion, that a very large gold field exists in the Buller Valley. Gold digging, however, at present, is nearly confined to the River Mangles (80 or 90 miles from Nelson), the Matakitaki, and the Lyell. A few parties are also found scattered on the banks of the Buller itself. The whole digging population is supposed to be about 250. Those on the Matakitaki are estimated at about 110, who have hitherto confined themselves to the lower 20 or 25 miles of the river. They are almost entirely given to digging in the river bed, a very precarious operation. If the terraces, however, admit of being successfully worked there will be room for very many hands during the winter, and quite out of danger of floods. Indeed, the difficulty in that kind of work is rather the want than the excess of water. The terraces being generally deeply intersected by the water flowing across them to the river, the drawback to this mode of working for gold is the necessity of going a long way back for water to where the higher level of the stream admits of its being led to the top of the terrace at its edge, where alone it is said that diggers have a chance of success. Such terraces are now worked very encouragingly along the Buller and Lyell, and, should they generally prove profitable, will materially add to the extent of our workable gold fields. A visitor to the gold diggers is much struck by the great enterprise displayed by them. They have often to engage in undertakings requiring risk, skill, and patience, before the actual work of gold digging begins. An abundant supply of water is one of the necessities of the occupation, and has often to be brought considerable distances, through a difficult and very uneven country. In one instance, at the Lyell, five men, after having brought water more than half a mile, have to lead it first over a deep rock gully, and finally across the chasm of the Lyell itself, using for this purpose troughs, slung, at an elevation of 100 feet, to trees, the points of suspension being about the same number of feet apart.

COPPER.—The first parcel of fine copper received from the smelting works at Cadiangullong mine (New South Wales), since the formation of the new company, has arrived in Sydney, and is to be sold by auction by Messrs. Mort and Co. It consists of ingots and cakes, amounting altogether to seven tons. The whole of this ore has been produced at the works since operations were commenced on the 15th ultimo.

ALPACAS.—It is understood that the Acclimatisation Society lately formed in Canterbury, New Zealand, contemplates purchasing a number of the alpacas about to be sold by the New South Wales Government.

NEW SOUTH WALES.—The mining operations at Colombo and other points of the Shoalhaven River

(New South Wales) have recently been attended with a run of bad luck. The late sudden rise in the Upper Shoalhaven carried away a large quantity of mining implements, and in one case the sluice-boxes of one claim were floating about among heaps of timber, with the yield of the day in it, and only saved by swimming for it. Races which had taken some weeks to cut were broken up, and, on being repaired, were found utterly profitless. The recent floods have completed the wreck that this sudden rise had commenced, and the greater part of the miners have left.

RAILWAYS IN NEW SOUTH WALES.—A contract will be taken shortly for a branch line, half-a-mile in length, connecting the Parramatta Railway, near Haslem's Creek, with the centre of the new cemetery. The line will enter the grounds from the Parramatta end, and will rise with a gradient of 1 in 44 and a curve of 18 chains radius; it will terminate in a dock 100 feet in length, the platform being level with the floor of the carriages.

Publications Issued.

LESSONS IN ELEMENTARY BOTANY, THE PART ON SYSTEMATIC BOTANY, BASED UPON MATERIALS LEFT IN MS. BY THE LATE PROFESSOR HENSLOW; with numerous Illustrations. By Daniel Oliver, F.R.S., F.L.S., &c. (*Macmillan and Co.*) 16mo., 317 pp.—Botanical text books abound in all directions and of all sizes, but, with few exceptions, are not expressed in terms sufficiently easy and elementary to be attractive to the large mass of those desiring to get an insight into the study, which is apt to dishearten men from its apparent abstruseness, arising from the mass of scientific terms employed and the learned discussions with which the earlier pages of the works are encumbered. Professor Oliver has endeavoured to avoid these difficulties. His first chapter is devoted to an examination of the common buttercup, and becomes a lesson in respect to the root, the stem, the leaves, the flowers, and the fruits of plants in general; and his second and third chapters, by means of the very same specimens, illustrate the principal functions of plants; while a fourth and fifth are devoted to a comparison of the buttercup with various other common familiar flowers, by which some notion of the differences of structure which occur amongst plants is plainly brought out. The sixth chapter explains the use of certain "flower schedules" largely employed in teaching by the late Professor Henslow—employed also by Professor Oliver, as he tells us, with much advantage in his own class, and strongly recommended by him both for private colleges and schools. The seventh chapter describes in further detail the various organs and their modifications; and the eighth, closing the first part, explains the minute structure and vital processes of plants. The second part of the book is devoted to the classification or systematic arrangement of plants, and in this portion much use is made of the schedules, one of them being devoted to a selected type of each natural order of our British flora. The learner is told not to be content with the examination of the plants used as types, but to try and refer every flowering plant which is met with to its type. If this is done, he is promised that in a short time the natural orders to which most British plants belong will be easily recognised. The little volume closes with instructions for drying plants, an appendix showing how to describe them, and a combined index and glossary. The text is freely illustrated by good woodcuts, most of which, as stated in the preface, were "drawn by Professor Henslow's daughter, Mrs. Barnard, of Cheltenham, from the admirable sheet-diagrams designed by Professor Henslow, and executed by Mr. Fitch for the Committee of Council on Education."

Notes.

SCALING AND OTHER LADDERS.—Some time ago Mr. George Fawcus presented a set of fire-escape ladders to the corporation of Tynemouth, of which an account appeared in the *Society of Arts Journal*.* He now proposes an improvement on his former plan, by making the rounds of the ladders turned straight, with shoulders to fit against the side pieces, a smaller part going easily into and through the side pieces; he secures the ladders together by five-eight inch or other iron bolts below the top and bottom steps, the ends of these bolts being squared and fitted into plates let neatly into the side pieces, the end beyond the side pieces being screwed, and neat screw-nuts fitted on; the outer sides of the top and inner sides of the bottoms of the side pieces are plated with iron plates that fit over the iron bars. In the centre of these bars there are open eyes either for fixing a rope tackling, or an eyebolt fits round the open eye and the top step of the ladder; the upper end of this eyebolt is swelled into a bulb-ended bolt, which fits into the open eye in the middle of the bar below the bottom step of the next ladder. When a number of these ladders are put together, two small eccentric discs or round plates are fitted on the back and front of the bulb-ended bolts; these fall and act like buttons, to prevent the bulb falling out of the socket either way. This stay thus dovetailing into the socket, the plates behind the screw-nuts, on the ends of the upper bars, form steps or cleets for the feet of succeeding ladders to rest upon.

THE CALABAR BEAN AND ITS PROPERTIES.—One of the witnesses who gave evidence at an inquest held not long since on a boy who was poisoned by eating Calabar beans, at Liverpool, has received a letter from a gentleman who has been a missionary in Calabar, describing the properties of the Calabar bean. The writer says:—"The Calabar bean, as an ordeal, is given in various quantities from below a dozen to over a hundred; but a very small portion, less than half, of a bean is sufficient to destroy life; while, on the other hand, entire dozens of the bean have been taken with impunity, being quickly rejected by the stomach and bowels. One bean halved between a brace of infatuated duellists has cut both off; and a woman who was tried for witchcraft some years ago, and who must have taken some dozens in the process, was still living and in vigorous health last year. When used by duellists, it is customary for the challenger to bite a bean in two, consume his half, and hand the other to his opponent, who is obliged to eat it up. This is said to be a common thing among the Ibebios. When it is administered in public trial, the accused is compelled to eat up a few beans just as you see them, while others were being pounded to pulp in his presence. This is afterwards well mixed with water, and one part of the mixture given as a drink, and the other administered in the form of an enema. If the poison so irritates the stomach and bowels as to be completely ejected, which is often the case, the party escapes, and is pronounced innocent; if not he dies, and is therefore guilty. The plant grows to a large size, one plant climbing sometimes over several trees, and almost entirely enveloping them in its foliage. It is often to be met with on the banks of the Calabar river. The flower is not unlike that of the sweet pea. The botanical characters have been described by Professor Balfour, of Edinburgh; while the powers of the bean have been to some extent tested by Dr. Fraser, of the Edinburgh University."

TELEGRAPHIC MESSAGES.—A reduction has been made in the cost of telegrams in Paris. A message can now be sent to any part of Paris for fifty centimes, and the administration guarantees that it shall be delivered within half-an-hour from the time it is dispatched.

* Vol. xii., p. 327.

LOSS OF LIFE IN COAL MINES.—By the Inspector's Report for the last year it appears that in that period there were no less than 757 fatal accidents, resulting in the loss of 907 persons in the coal mines of Great Britain.

MINING SCHOOL.—The *Mining and Smelting Magazine* states that the proposition for a Glasgow School of Mines is abandoned, the anticipated subscriptions from coal and iron masters not having been forthcoming.

Patents.

From Commissioners of Patents Journal, September 9th.

GRANTS OF PROVISIONAL PROTECTION.

Aerostatic machine—2030—R. A. Brooman.
Alimentary substances, preservation of—2043—P. A. L. de Fontainemoreau.
Artificial leather, manufacture of—2095—R. Beard, jun., and W. Downing.
Axles and axle-boxes, construction of—2054—F. Swift.
Bedsteads, construction of—2117—E. John.
Bonnets, &c., thread for the manufacture of fabrics and ornaments for—2124—R. A. Brooman.
Boots and shoes, knife for cutting the clamps of—2002—P. Lang.
Buildings, shop-fronts, &c., apparatus for washing, &c.—2138—W. C. S. Percy.
Carriage springs, apparatus for forging—1762—W. Cary.
Carriage windows—2112—R. Marshall.
Cast steel, manufacture of—2031—R. A. Brooman.
Cattle, troughs, racks, and enclosures for—2136—A. E. Peirce.
Chimney pieces—2016—H. C. Tucker.
Churns—2008—G. Haseltine.
Clipper mowing machine—1998—A. B. Childs.
Clothes, &c., apparatus for receiving or holding—2103—A. Newton.
Conservatories, hot water apparatus for heating—2000—J. Milbank.
Cotton, &c., presses for pressing—2022—J. Hodgart.
Cotton, opening, cleaning, and ginning—2034—W. Hoehl, C. Brakell, and W. Gunther.
Cotton seed, cleansing and treatment of—1996—R. D. Edwards.
Dyeing, &c., manufacture of colours for—2060—H. Parkes.
Eggs, preservation of—2026—R. T. Monteith.
Electricity, batteries for generating—2063—J. Thomsen.
Embankments, &c., caissons employed in constructing—2142—G. Furness and L. G. Mocre.
Fabrics, machinery for tentering or stretching and drying—2111—H. Jackson.
Fibrous materials, preparing, &c.—2114—E. Calvert and T. Edmeston.
Fibrous materials, self-acting mules for spinning—2119—J. Cheetham.
Fibrous substances, bleaching of—2097—H. Potter.
Fibrous substances, covering rollers for preparing, &c.—2109—W. Allen and W. Johnson.
Fire-arms, breech-loading—2048—T. Wilson.
Fire-arms, locks for—2013—J. P. Lindsay.
Fire-arms, patched balls for—2014—M. Peck.
Floating docks—2118—J. Campbell.
Fuel, manufacture of compressed—2056—J. Grantham.
Garments, manufacture and ornamentation of—1594—B. Nicoll.
Gas, admission, exclusion, and regulation of—2058—C. E. Albrecht.
Gas burners—2092—R. Pilkington.
Gases, regulating the pressure and supply of—2044—W. Dalziel.
Grave monuments—2115—J. Niven.
Guns—2024—W. H. Cox.
Hair pins—2125—R. A. Brooman.
Hand-drilling apparatus—2042—G. Hodgson.
Hemp, &c., treatment of waste from—1839—R. A. Brooman.
Houses, &c., preventing damp, insects, and vermin from entering—2068—F. Feichtinger.
Human excrement, receiving, drying, and deodorising—2072—F. Taylor.
Hydraulic pumps, &c., stop-cocks, taps, or valves employed in—2089—E. Taylor and W. J. Dorning.
Iron and steel, manufacture of—2104—R. Hill.
Iron, coating with steel—2126—J. Lones.
Jute, &c., preparation of—2093—H. L. Kolzewsky, R. Hart, and J. F. Calder.
Lace machinery, bobbin carriages used in—2098—W. Cope.
Lace machinery, manufacture of fabric in—2066—J. Hartshorn and W. Redgate.
Looms—2071—C. W. Harrison.
Looms—2133—C. W. Harrison.
Machinery, disconnecting apparatus for stopping—2140—A. F. Fontaine.
Metallic nuts, manufacture of—2057—E. H. Waldenstrom.
Minerals, machinery for cutting—2121—F. W. Armitage.
Mines, lighting and firing charges in—2100—R. A. Brooman.
Missiles, discharging and exploding under water—1869—A. Alexander.
Paper, applying water marks in—2037—W. Dove.
Paper, &c., manufacture of—2106—H. Hathaway and W. Todd.
Passengers, &c., apparatus for landing—2087—H. Greaves.
Photographic pictures, apparatus employed in taking—2122—R. W. Thomas.
Railway carriages, signalling between passengers and guard, &c.—2038—W. Milligan.
Railway carriages, transferring from one line of rails to another—2102—G. H. and H. R. Cottam.
Railways, communication between passengers and guard—2134—G. Witson.
Railway signals—2141—Sir J. Macneill.
Railway trains, apparatus for retarding and stopping—2094—J. Matthews.
Railway trains, communication between passengers and guard—2049—W. Clark.
Railway trains, communication of passengers from carriage to carriage—2052—C. Cotton.
Railway trains, communication between passengers and guard—2053—W. Thomas.
Railway trains, communication between passengers and guard—2078—T. H. Cleveland.
Sails, reefing and furling—2120—W. Rowden.
Sewing machinery—2040—A. V. Newton.
Sewing machines—2010—G. Davies.
Ships, combination of steam and air as a motive power to—2139—J. B. Andreux and E. Coulon.
Ships, &c., sheathing and protection of—2131—H. H. Henson.
Ships, propulsion of—2065—J. G. White.
Ships, sheathing and coating the bottoms of—2096—T. J. Hughes.
Ships, signalling apparatus on board of—2123—R. A. Brooman.
Silk floss, production of—2032—S. and C. Collins.
Spinning machinery—2074—B. W. Barwick and W. Hartley.
Stoves, portable—1936—W. Prockter.
Submarine shells—2064—G. Davies.
Telegraph cables, machinery for winding, &c.—2080—R. A. Brooman.
Tubular and hollow articles, manufacture of—2046—G. Coles, J. A. Jaques, and J. A. Fanshawe.
Watches—2107—M. L. Muller.
Water, apparatus for purifying—2018—E. Andries.
Water-closets—2129—J. Shanks.
Water-closets, &c., supply of water to—2061—F. G. Underhay and R. Heyworth, jun.
Water, raising and discharging—2086—W. Spence.
Wood, machinery for planing—2110—E. Hunt.
Wrenches—2077—R. M. Black.
Yarns, &c., apparatus for washing and cleansing—2012—M. Brown.

PATENTS SEALED.

571. W. E. Gedge.
575. J. Symes.
585. D. Brodie.
587. C. Brakell.
588. F. Spiers and C. Pond.
592. E. Bishop and W. Bailey.
594. N. Thompson.
595. J. L. Norton.
596. W. E. Broderick and W. Rees.
597. J. T. Way.
598. G. T. Bousfield.
601. J. H. Schofield.
612. F. Walton.
613. W. Wilson.
617. C. J. Sharp.
619. W. T. W. Jones.
621. H. Simester and J. Bainbridge.
623. J. Crompton.
624. C. E. Wallis.
629. L. A. Durrieu.
631. A. Smith.
634. J. Platt and W. Richardson.
635. R. Fletcher.
639. T. Parkinson, F. Taylor, and T. Burton.
642. H. Eastwood and B. Matthews.
644. S. Holmes.
645. W. E. Gedge.
646. J. Platt and G. Little.
648. W. Hensman.
649. C. R. Broadbridge.
652. T. Chamberlayne.
654. T. P. Tregaskis.
655. J. Empson & H. von Hartz.
659. A. H. Martin.
661. E. F. Ruffin.
662. J. Rowell.
668. J. Carrick.
672. H. Bateman.
685. J. Bleasdale.
692. J. Genevrier & P. E. Bidaux.
693. F. Dancart.
709. A. B. Childs.
756. W. Clark.
761. M. Clough.
784. H. Smith and E. Roberts.
807. E. Stott.

From Commissioners of Patents Journal, September 13th.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2295. H. C. Jennings.
2241. J. Holland and G. Okell.
2253. R. A. Brooman.
2325. W. Cory, jun.
2385. J. Cottrill.
2265. C. Greaves.
2285. G. Dixon.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2350. E. Lavender.
2363. W. Crofts.
2391. G. B. Bensen.
2513. E. Thompson and W. J. Nicholson.
2367. J. Mills.
2371. C. Lungley.
2382. W. Jenkins.

Registered Designs.

Geometric joint for walking and umbrella sticks—4655—D. Elkan, 1, Copley-terrace, Wenlock-street, and 15, Arlington-street, New North-road.
Lantern or lamp case—4656—A. Leslie, Tarriff, Aberdeenshire.
False or show slides—4657—G. Burton, 3, St. John's-st., Clerkenwell.